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(54) Jet boat.

(57)

2.1 Known motorcycle-type jet boats are provided at opposite sides of a seat bench with foot troughs opening towards the stern. When the jet boat is not under way, water may flow from the stern into the foot troughs, causing discomfort to the user.

2.2 According to the invention, the foot troughs (18,19) are closed at the stern portion of the boat by a transverse body (20) disposed at a spaced location from the stern (8) for preventing the inflow of water from the stern.

2.3 The jet boat is useful for aquatic sports and may also be used as a boat for line-fishing.

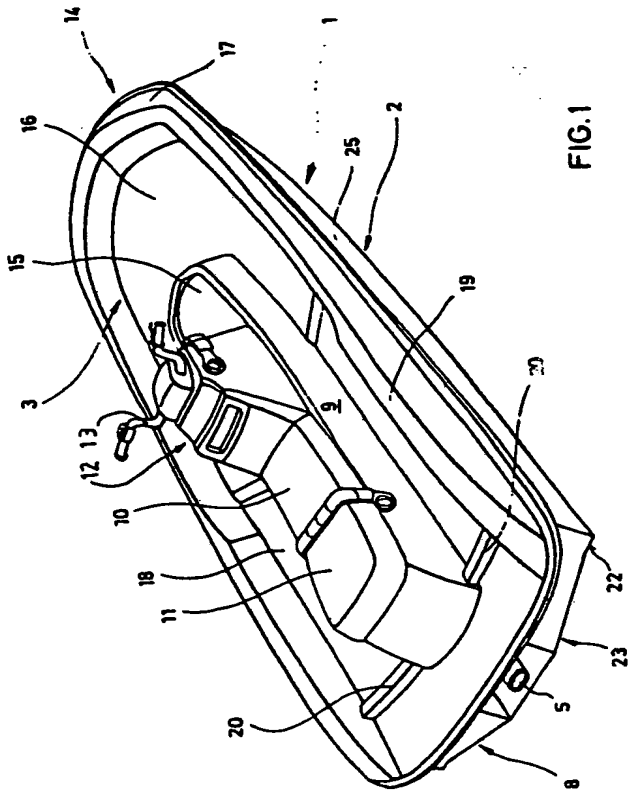

FIG.1

EP 0 304 821 A1

Jet Boat

The invention relates to a jet boat having a hull and a deck supporting a raised seat bench extending from the stern towards the bow, and a control cockpit provided in front thereof approximately at the longitudinal center of the boat, a foot trough opening towards the stern being formed on each side of said seat bench.

Known from practical use are so-called "jetbikes" or "wetbikes". Their deck supports a longitudinally extending motorcycle-type seat bench with a driver's seat and in front thereof a control cockpit similar to the handlebar of a motorcycle. The driver sits astride on the seat bench and supports himself with his feet in the foot troughs. The provision of the foot troughs permits a very low center of gravity to be obtained for the jet boat as a whole, i.e. together with the rider, to thereby improve the safety and stability of the jet boat in operation. The provision that the two foot troughs are open towards the stern is intended to ensur that spray water or the like entering the foot troughs during travel is able to flow off towards the stern. On the other hand a jet boat of this type should always be provided with a low boarding sill permitting the rider to climb aboard in deep water, for instance after having been thrown off by a wave. There is the disadvantage, however, that the sternwards opwn foot troughs permit water to flow thereinto when the jet boat is drifting, which is rather disagreeable, particularly when the rider wants to carry out an activity, such as fishing, from th drifting boat. In this time the rider's feet wouls always be awash, which is rather uncomfortable.

It is therefore an object of the present invention to improve a jet boat of the type defined in the introduction in such a manner that the undesirable inflow of water into the foot troughs is suppressed as far as possible, whenever the boat lies stern-heavy in the water, while retaining the possibility of r adily boarding the boat from the water.

In accordance with the invention this object is attained by the provision that the foot troughs adjacent the stern of the boat are closed by a transverse body spaced from the stern for proventing th inflow of water from abaft.

This solution offfers the advantage on the one hand that the undesirable inflow of water into the foot troughs is suppressed, and on th other hand, that boarding of the jet boat from the water is not hampered. This is because the boarding sill remains as low as in the case of a conventional jet boat.

According to a preferred embodiment the transverse body is formed as a transverse baffle in the form of a st p. This offers the advantage of facilitating the boarding of the jet boat from the water, as it is possible to grip the transverse baffle when so boarding. For reaching the deck it is initially not required to step over the transverse baffle, because the boarding sill is as low as in the conventional construction.

The transverse body may also be formed as a ramp rising towards the stern, resulting in the advantage that spray water entering the foot troughs during the ride can be discharged in a particularly simple manner.

In a particularly advantageous embodiment the transverse body may be of resiliently compressible anture, permitting it in effect to act as a valve. By stepping on the thus devised transverse body it is possible to cancel its obturating function. The resiliently compressible nature of the transverse body also offers the possibility of locating it immediately at the stern. This is because when the rider wants to board the jet boat from the water and to this purpose supports his weight on the transverse body, the latter is compressed, so that due to the compression of the resilient transverse body the boarding sill will essentially be no higher than that of a conventional jet boat without a transverse body. For this reason independent protection is claimed for this embodiment.

The resiliently compressible nature of the transverse body may be obtained in a simple manner by forming it as a rubber-elastic tubular bellows. This tubular bellows is capable of being easily compressed and of subsequently returning to its original shape.

The transverse body may also be formed as a buoyant flap mounted on the deck for pivoting about a for'ard horizontal axis, permitting the flap to return to its obturating position in the absence of a force acting thereon from above, to thereby prevent the inflow of water into the foot troughs from the stern. The buoyant flap offers the further advantage that it obturates the foot troughs only when the stern is submerged to a depth at which water would flow into the foot trough in the absence of a transverse body. Otherwise the top surface of the flap lies flat, so that spray water or the like entering the foot troughs during the ride is permitted to flow off at the stern.

In a particularly advantageous embodiment, the aft end portions of the foot troughs may be formed with a recess of triangular cross section and having a boundary wall facing towards the stern, in which case the flap is likewise of triangular shape and mounted along one of its sides for pivoting about a horizontal transverse axis, so that the flap is capable of being substantially received in the rec ss,.

the bottom of the latter being provided with a drain opening. As soon as the aft end of the jet boat is immersed to a predetermined depth, water is permitted to flow into the recess through the drain opening, causing the flap to float up so as to assume its obturating position. As a result of the flap's shape being complementary to that of the recess, the flap is caused to float up already before any water flows into the foot troughs from the stern. The flap thus obturates the aft end of the foot troughs only when positively required, but then early enough to prevent any water from flowing into the foot troughs.

According to a particularly advantageous improvement of this embodiment, the drain opening of the recess may communicate with a drain pipe opening towards the stern below the waterline of the hull. When the jet boat is under way, the drain pipe creates an injector pump effect due to the drop of the static pressure at the mouth of the drain pipe for positively draining any water from the recess. As a result, the flaps are automatically retracted into the recesses when the jet boat is under way, and that even when the lower portions of the recesses are at least partially below the water line. Any water present in the foot troughs is thus permitted to be completely drained therefrom as long as the jet boat is under way. The described embodiment offers the further important advantage that astern travel of the jet boat would immediately cause water to flow into the recesses, so that the flaps would be raised to the obturating position, even if the stern were substantially above the water level. The stern wave created by the astern travel is thus prevented from entering the foot troughs.

An embodiment of the jet boat according to the invention shall now be described by way of exampl with reference to the accompanying drawings, wherein:

fig. 1 shows a perspective view from above of a jet boat according to the invention,

fig. 2 shows a top plan view of the jet boat of fig. 1,

fig. 3 shows a sectional view taken along the line III-III in fig. 2,

fig. 4 shows a front end view of the hull of the jet boat of fig. 1,

fig. 5 shows a partically sectioned sideview of the jet boat of fig. 1,

fig. 6 shows a partially sectioned sideview of another embodiment of a jet boat and depicting different waterlines corresponding to respective operating conditions and load distributions,

fig. 7 shows a bottom plan view of th hull of the jet boat of fig. 6 and d picting the different waterlines corresponding to respective operating conditions and load distributions,

fig. 8 shows a sideview of stil another embodiment of a j t boat, and

fig. 9 shows the jet boat of fig. 8 illustrating a different operating condition or load distribution.

Shown in the drawings are several embodiments of jet boats 1. The characteristics common to all of these embodiments shall at first be described before discussing the particulars of the individual embodiments. Each jet boat 1 has a substantially flat hull 2 carrying a likewise substantially flat deck 3. Provided abaft is a jet propulsion system 4 with a jet nozzle 5 opening at the lower stern. Jet propulsion system 4 is powered by an engine 6 disposed adjacent the longitudinal center of hull 2, or more accurately, at the center of gravity CG. Disposed for'ard of engine 6 is a tank 7 for the fuel supply of engine 6.

Deck 3 carries a raised seat bench 9 extending for'ards from stern 8. Seat bench 9 comprises a driver's seat 10 and a pillion seat 11. For'ards of seat bench 9 there is a control cockpit 12 comprising motorcycle-type handlebars 13 connected in a per se known and therefore not detailedly shown manner to jet propulsion system 4. Control cockpit 12 is located above center of gravity CG, and thus above engine 6. Seat bench 12 extends beyond control cockpit 12 towards the bows 14 so as to form a front seat 15 for'ard of control cockpit 12. Formed in deck 3 about seat bench 9 is a gutter 16 defined by coamings 17. At both sides of seat bench 9 gutter 16 merges with two foot troughs 18, 19 opening towards stern 8. The aft ends of foot troughs 18, 19 are each obturated by a respective transverse body 20 spaced from stern 8 for preventing the inflow of water from the stern.

As shown particularly distinctly in figs. 3, 4, 6 and 7, hull 2 of jet boats 1 is of a combined box-shaped and triangular construction, the bottom side 21 of the substantially rectangular hull bottom 22 being formed with a substantially triangular raised portion 23 extending towards the stern. The for'ard portion of hull bottom 22 is substantially box-shaped and relatively flat, whereas the aft portion of hull bottom 22 is of a more or less triangular cross-sectional shape extending to a greater depth. The two lateral sides 24 and 25 of hull 2 extend substantially parallel to one another and perpendicular to the lateral edges of bottom 22. In the stopped condition, i.e. with the jet boat 1 adrift, th major part of hull sides 24 and 25 is immersed in the water.

The shape of hull 2 may be even more clearly described with reference to the different waterlines (a) to (e) corresponding to various load and op rating conditions. Th se waterlines are depicted in figs. 6 and 7.

The waterline (a) applies when driver's seat 10 and pillion seat 11 of seat bench 9 are occupied by

two persons and jet boat 1 is under way. In this cas the water lin substantially circumscribes a triangle as clearly shown in fig. 7.

A course alteration causes hull 2 to heel, resulting in a corresponding displacement of the waterline. This state is depicted in fig. 7 by waterline (b) corresponding to a course alteration to port. It is to be noted that under these conditions the box-shaped bow section of hull 2 remains clear of the water, the waterline (b) being still of a substantially triangular configuration.

Waterline (c) corresponds to the state in which the two seats 10 and 11 of seat bench 9 are occupied by two persons while jet boat 1 is not under way, i.e. adrift. In this state both sides 24, 25 of hull 2 are immersed to a major part. With the exception of its for'ard portion, waterline (c) circumscribes a substantially rectangular shape in this stat . The for'ard portion of waterline (c) encloses an angle α with its apex centered on the longitudinal centerline CL of jet boat 1.

Waterline (d) corresponds to the state in which jet boat 1 is adrift and driver's seat 10 and front seat 15 are each occupied by a passenger. It is readily noted that the for'ard portion of waterline (d) has been displaced farther for'ard, resulting in a spreading of the enclosed angle α'. The configuration of the waterline thus approaches that of a rectangle still further.

Teh waterline designated (e) in fig. 6 corresponds to the state that the boat is adrift while only front seat 15 is occupied by a passenger. This state is also depicted in fig. 7, clearly showing that waterline (e) approaches the rectangular shape still further, although bows 14 is immersed somewhat deeper than stern 8. The for'ard portion of waterline (e) now encloses the maximum angle α''. Also under these conditions, the major part of the hull's sid s 24 and 25 remains immersed.

In order to obtain the described configurations of the water line under the respective load and operating conditions, it is important, apart from the configuration of the hull's bottom, that the center of gravity CG be located substantially below cockpit 12 at about 40 to 45% of the hull's length from stern 8. Front seat 15 is located substantially at the same distance from center of gravity CG as driv- r's seat 10. As a result, jet boat 1 is in a balanced state when drifting with front seat 15 and driver's seat 10 occupied. This state is shown in fig. 5.

The particulars of the various embodiments shall now be described in detail. These particulars mainly concern the construction of the transverse bodies 20 closing the aft ends of foot troughs 18 and 19.

In the embodiment shown in figs. 1 and 2, the transverse body is formed as a baffle 20 extending transversely of the longitudinal direction of the troughs somewhat for'ard of stern 8. Baffle 20 obturates the aft end of the respective foot trough 18, 19 to prevent the inflow of water thereinto from the stern when the latter is deep in the water. On the other hand, baffle 20 is located far enough for'ard of stern 8 for not hampering boarding of the boat from the water. Baffle 20 may even be used as a grip ledge to facilitate boarding from the stern.

In the embodiment shown in fig. 5, the transverse body comprises a resiliently compressible tubular bellows 26 extending transversely of foot troughs 18, 19. The non-deformed or relaxed state of bellows 26 is depicted in solid lines. The exertion of pressure from above, for instance by pushing downwards with a foot, causes bellows 26 to assume the shape indicated by dotted lines. The thus designed transverse body may thus be of a greater height than a rigid body without thereby preventing water that has entered foot troughs 18, 19 from flowing off towards the stern. The exertion of sufficient pressure on bellows 26 permits any water to be drained from the foot troughs while the jet boat is under way. To accomplish this effect the drievr or pillion-rider may for instance stand on bellows 26 while the boat is under way.

In another embodiment shown in fig. 6, the transverse body is formed as a flap mounted for pivoting about a horizontal pivot axis extending transversely of foot troughs 18, 19. Flap 28 is biased by a spring element 29 towards the obturating position shown in fig. 6, in which flap 28 prevents the water inflow from the stern into foot troughs 18, 19. Spring element 29 may be compressed by stepping onto flap 28 for permitting water already present in foot troughs 18, 19 to flow off towards the stern.

Shown finally in figs. 8 and 9 is an embodiment comprising a transverse body in the form of a buoyant flap 28. The aft end portion of each foot trough 18, 19 is provided with a recess 30 of triangular cross-sectional shape extending transversely of deck 3. The lowermost portion of recess 30 is provided with a drain opening communicating with a drain pipe 31 extending to the bottom side 21 of the hull's bottom 22 with its mouth opening towards stern 8. The for'ard portion of flap 28 is pivotally mounted about a horizontal pivot axis 27 extending transversely of foot troughs 18, 19. The two dash-dotted lines (f) and (g) in figs. 8 and 9 illustrate the respective waterline.

The waterline (f) in fig. 8 corresponds to the normal operating condition, with jet boat 1 under way and driver's seat 10 and pillion seat 11 occupied by two passengers. In contrast thereto, the waterline (g) in fig. 9 corresponds to the state in which jet boat 1 is drifting with stern 8 under excessive load as by a single person aboard occupying pillion seat 11. In this state water flows into

recess 30 both from the stern and through drain pipe 31, causing flap 28 to float up. As a result, flap 28 obturates the aft portions of foot troughs 18, 19 to thereby prevent the inflow of water. Under normal load of the boat, the waterline extends below the lowermost portion of recess 30, and flap 28 is completely received within recess 30. Flap 28 will obviously be caused to float up already as soon as water enters recess 30, i.e. before stern 8 is immersed.

When the jet boat is under way, flap 28 is also lowered into recess 30 even when the waterline (f) is not below the lowermost portion of recess 30. This is because when jet boat 1 is under way, an injector pump effect is created at the mouth of drain pipe 31, causing water contained in recess 30 to be drained therefrom, so that flap 28 cannot float up. As soon as the speed of the boat is reduced, the static pressure adjacent the mouth of drain pipe 31 at the bottom side 21 of the hull will rise, as a result of which flap 28 is permitted to float up to th reby obturate the aft end portion of foot troughs 18, 19.

All of the described embodiments of the transv rse body 20 have in common that the flow-off of water already present in foot troughs 18, 19 is scarcely hampered, while the inflow of water from the stern is substantially prevented. Boarding of jet boat 1 from the water over the stern is not hampered by any of the transverse bodies 20.

Claims

1. A jet boat (1) having a hull (2) with a deck (3) carrying a raised seat bench (9) extending for'ards from the stern (8), and for'ards thereof a control cockpit (12) located adjacent the longitudinal center of the boat, and a foot trough (18, 19) opening towards the stern (8) provided on both sides of said seat bench (9), characterized in that said foot troughs (18, 19) are closed at the stern portion of the boat by a transverse body (20) disposed at a spaced location from said stern (8) for preventing the inflow of water from the stern.

2. A jet boat according to claim 1, characterized in that said transverse body (20) comprises a transverse baffle forming a step.

3. A jet boat according to claim 1 or 2, characterized in that said transverse body is foremd as a ramp (28) rising towards the stern.

4. A jet boat (1) having a hull (2) with a deck (3) carrying a raised seat bench (9) extending for'ards from the stern (8), and for'ards thereof a control cockpit (12) located adjacent the longitudinal center of the boat, and a foot trough (18, 19) opening towards the stern (8) provided on both sides of said seat bench (9), particularly according to any of claims 1 to 3, characterized in that said transverse body (26) is of a resiliently compressible nature.

5. A jet boat according to any of claims 1 to 4, characterized in that said transverse body is formed as a rubber-elastic tubular bellows (26).

6. A jet boat according to any of claims 1 to 5, characterized in that said transverse body is formed as a buoyant flap (28) mounted on said deck (3) for pivoting about a for'ard horizontal transverse axis (27).

7. A jet boat according to any of claims 1 to 6, characterized in that the aft end portion of each foot trough (18, 19) is formed with a recess (30) of triangular cross-sectional shape with a boundary wall facing towards the stern, said flap (28) being likewise of triangular cross-sectional shape and mounted with one of its edges for pivoting about said horizontal transverse axis (27) in such a manner that said flap (28) is substantially receivable in said recess (30), the bottom of said recess being provided with a drain opening.

8. A jet boat according to any of claims 1 to 7, characterized in that said drain opening of said recess (30) communicates with a drain pipe (31) opening towards the stern below the waterline (f) of the hull.

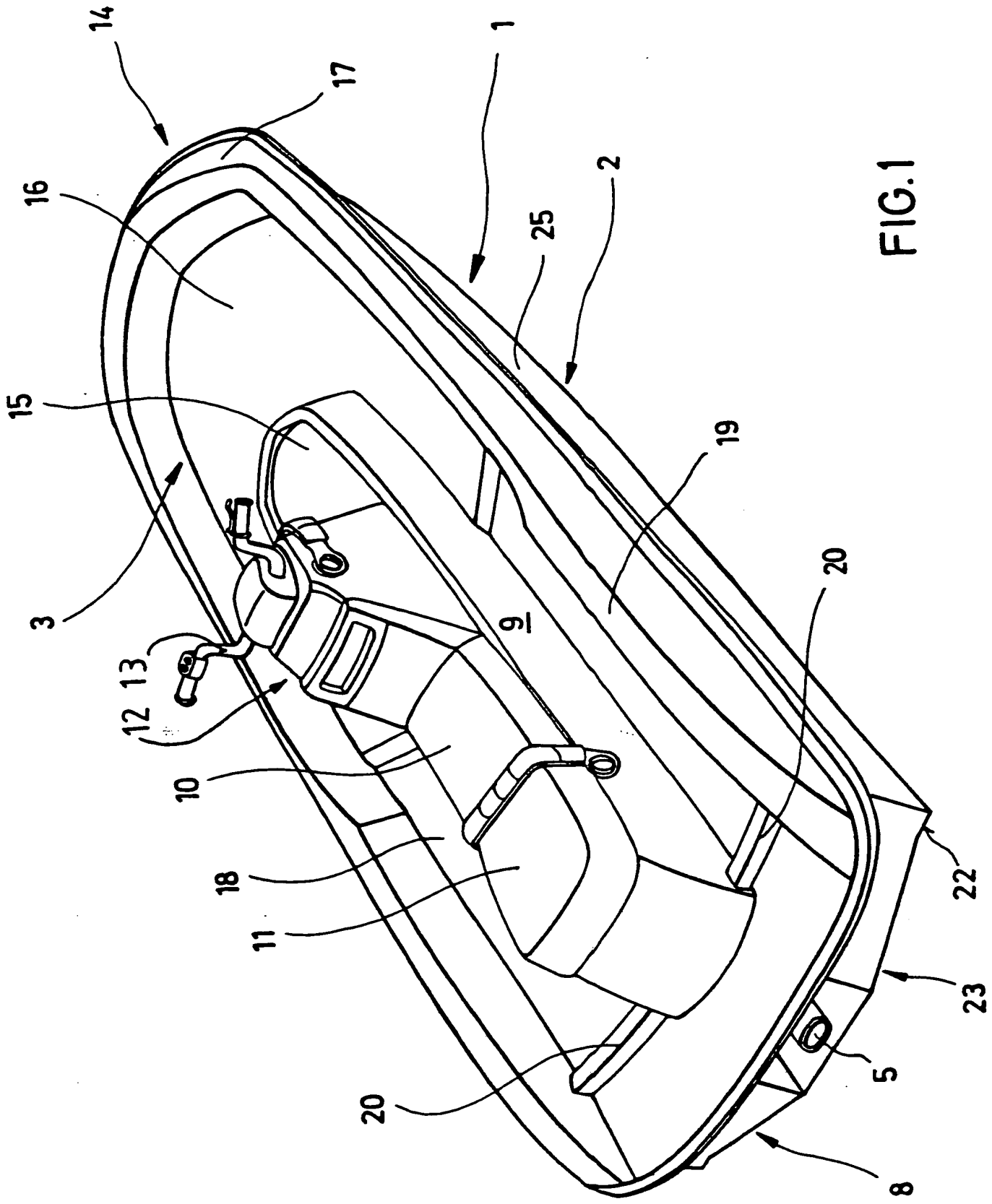

FIG.1

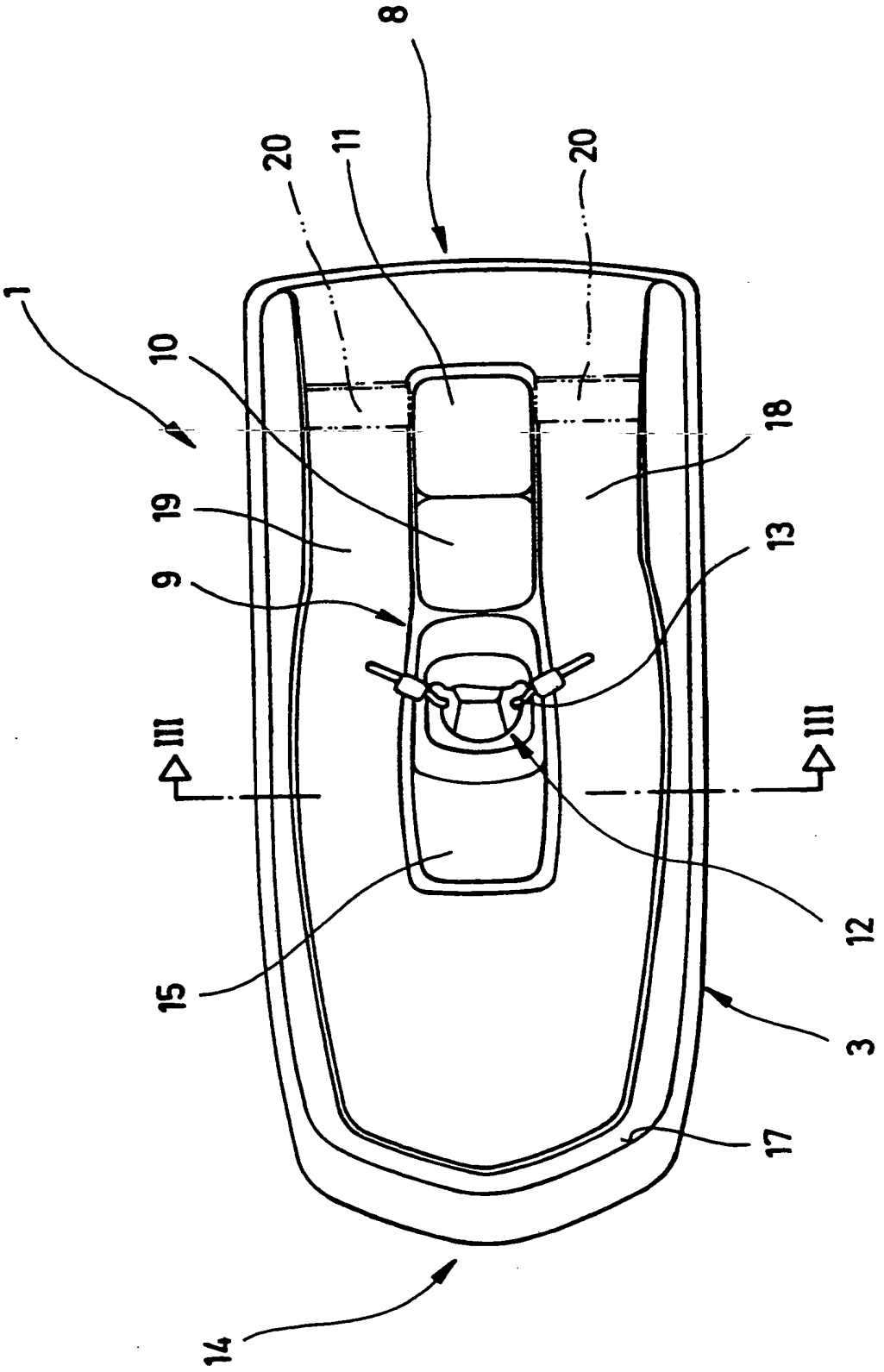

FIG.2

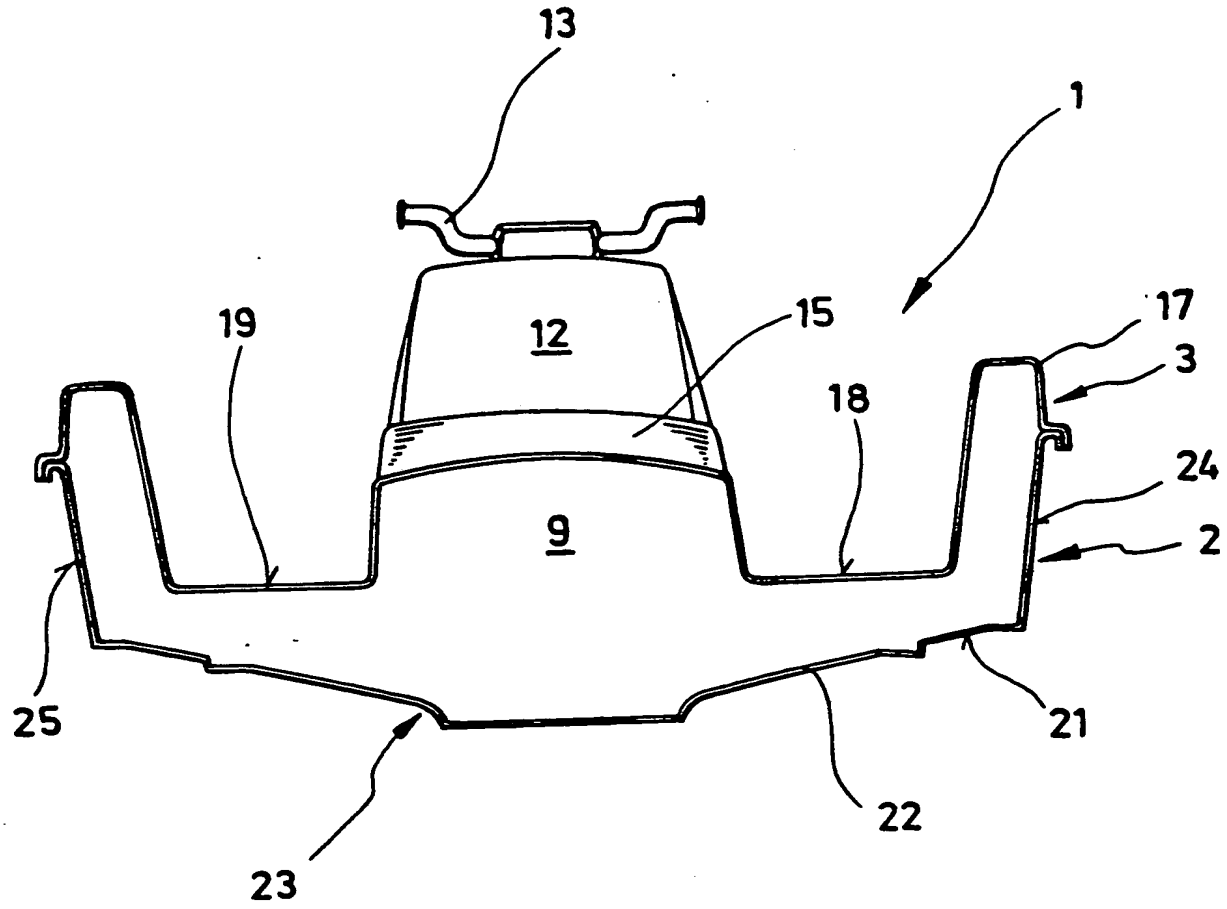

FIG.3

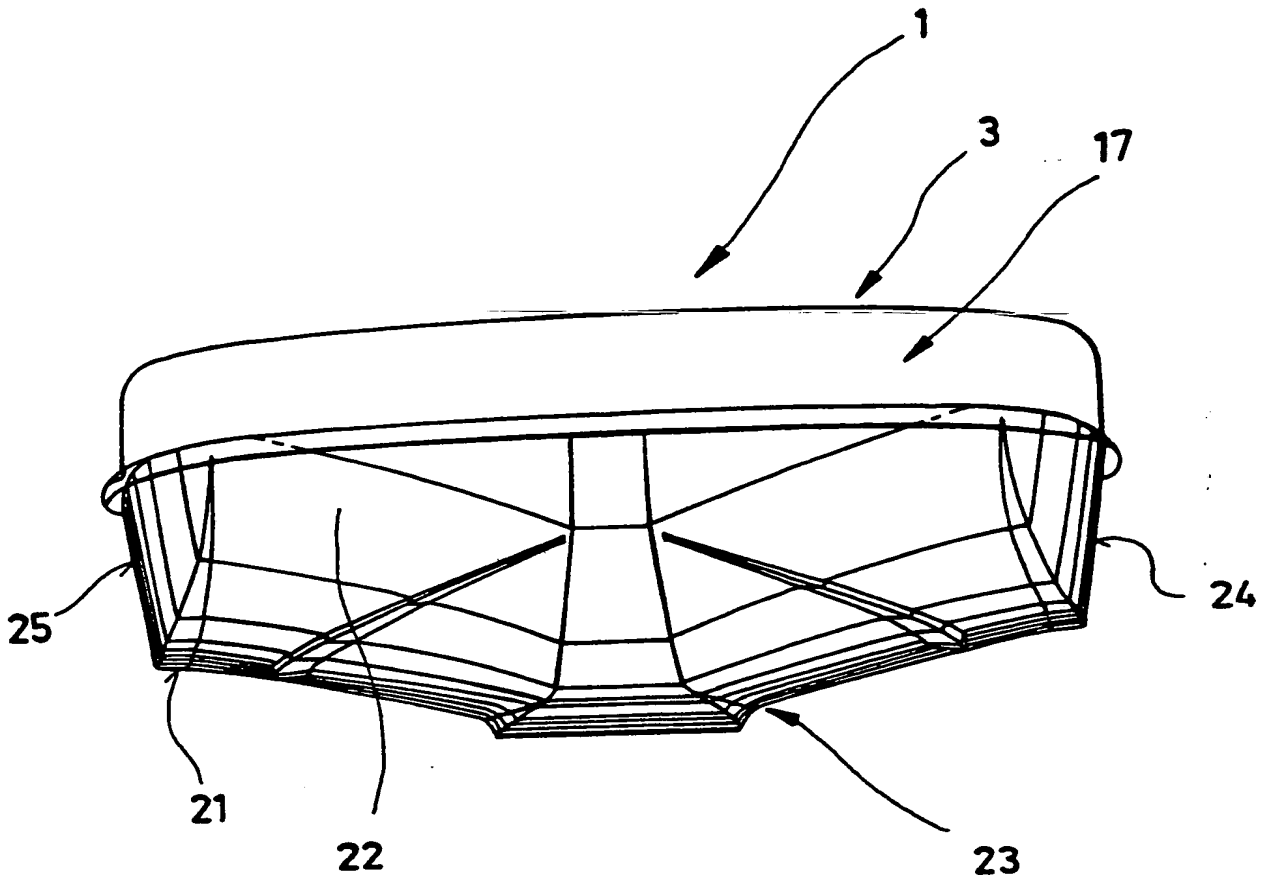

FIG. 4

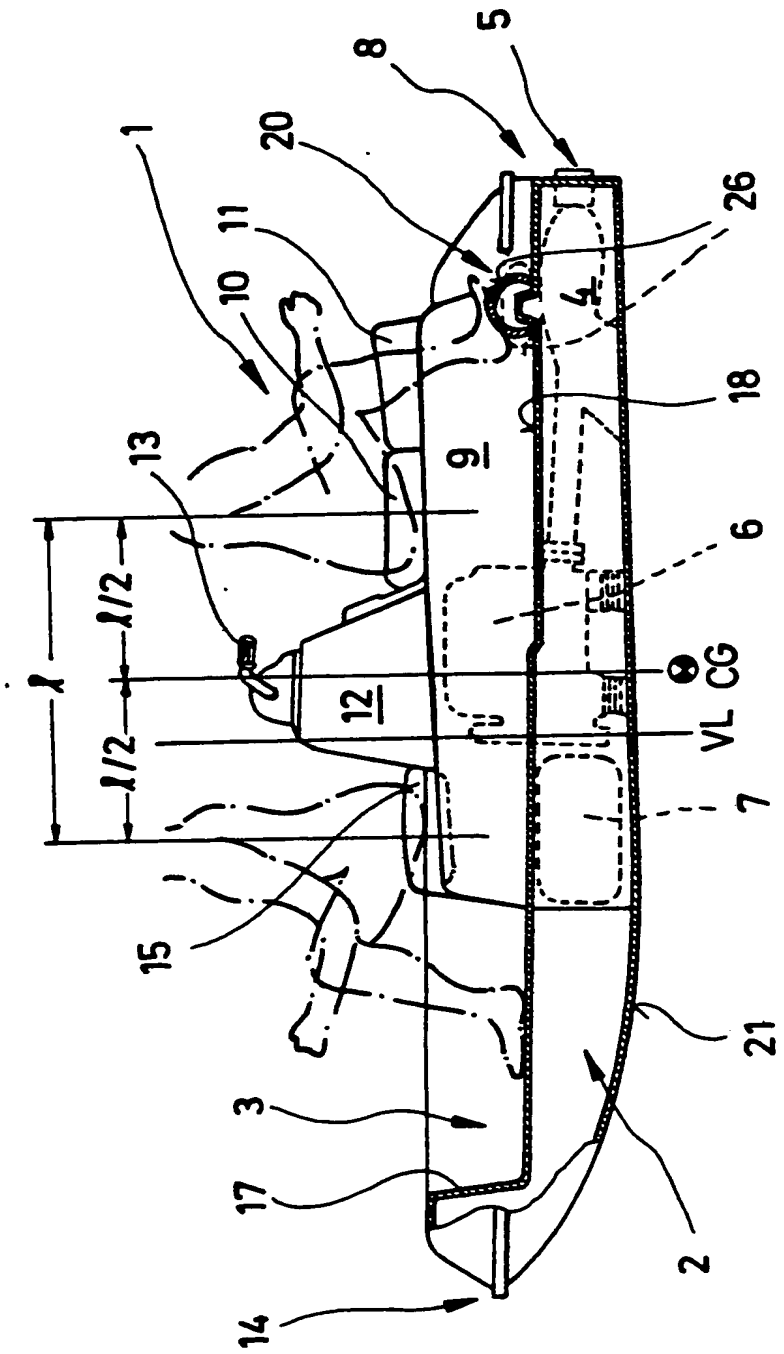

FIG.5

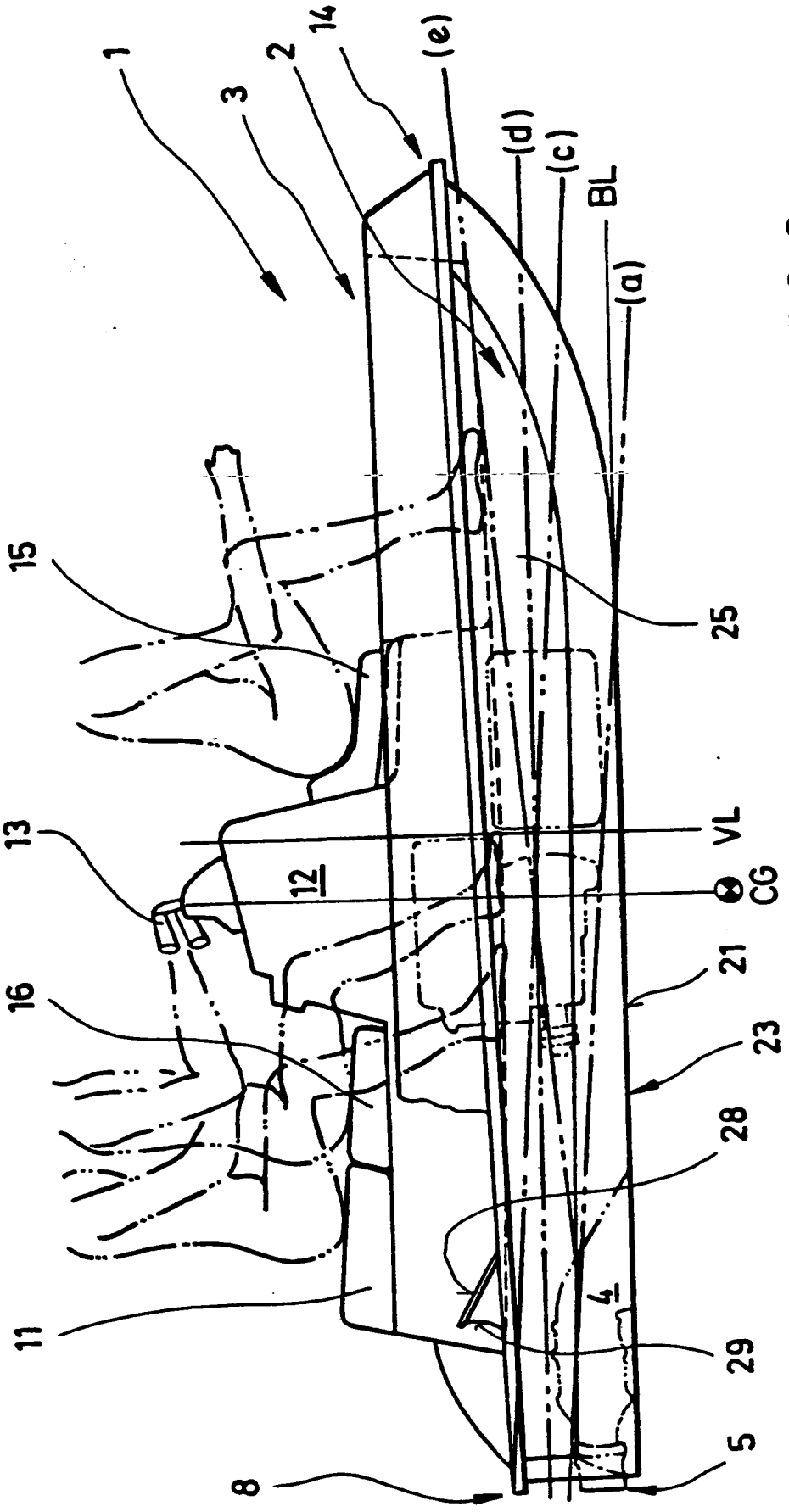

FIG. 6

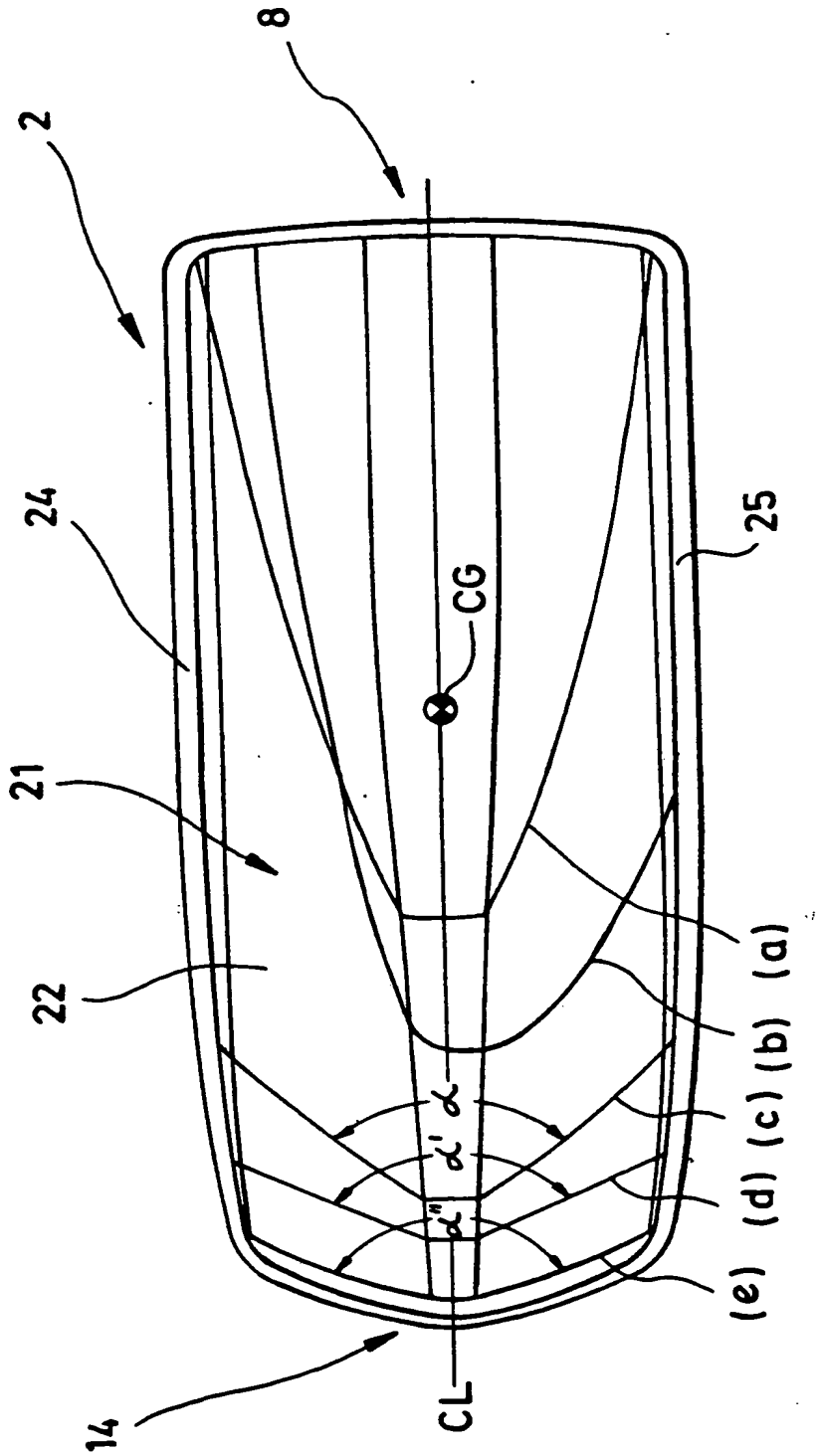

FIG.7

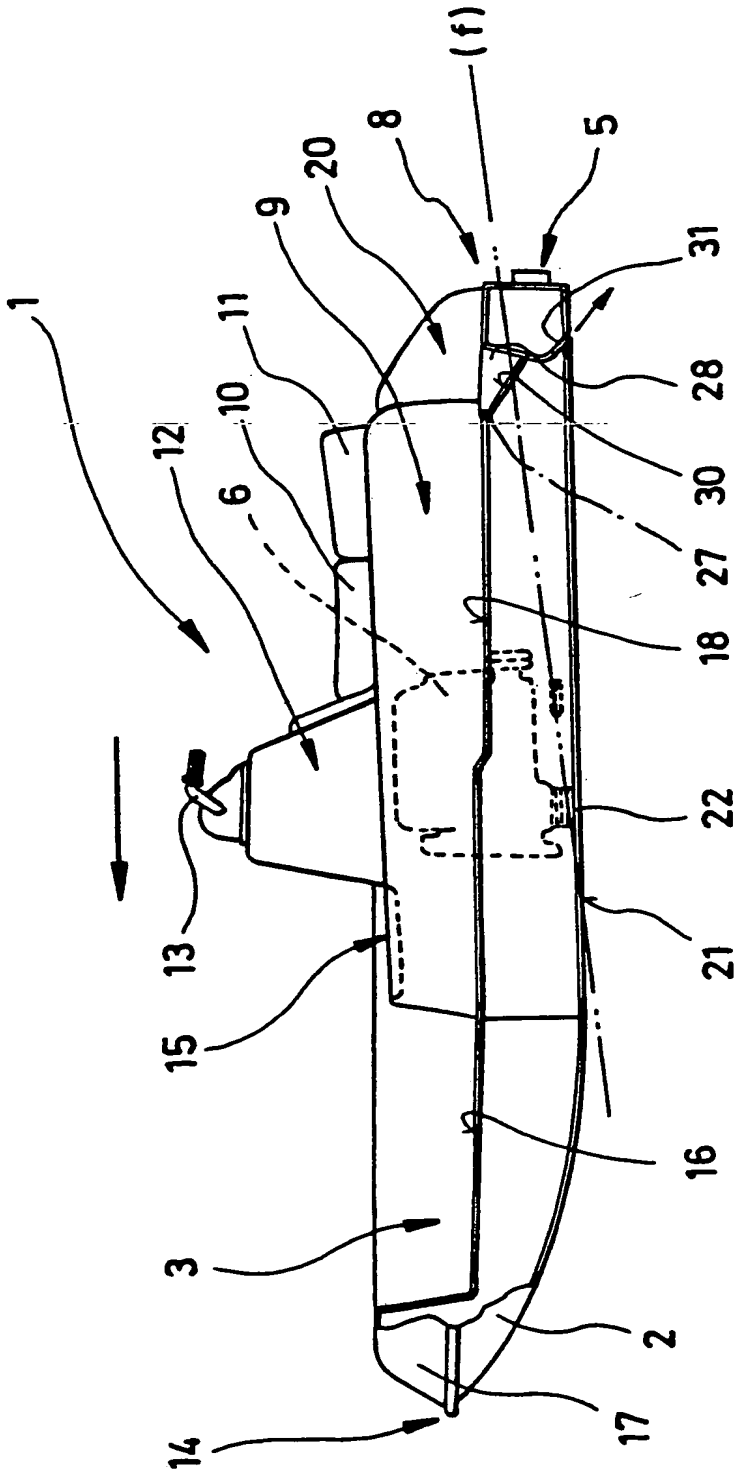

FIG.8

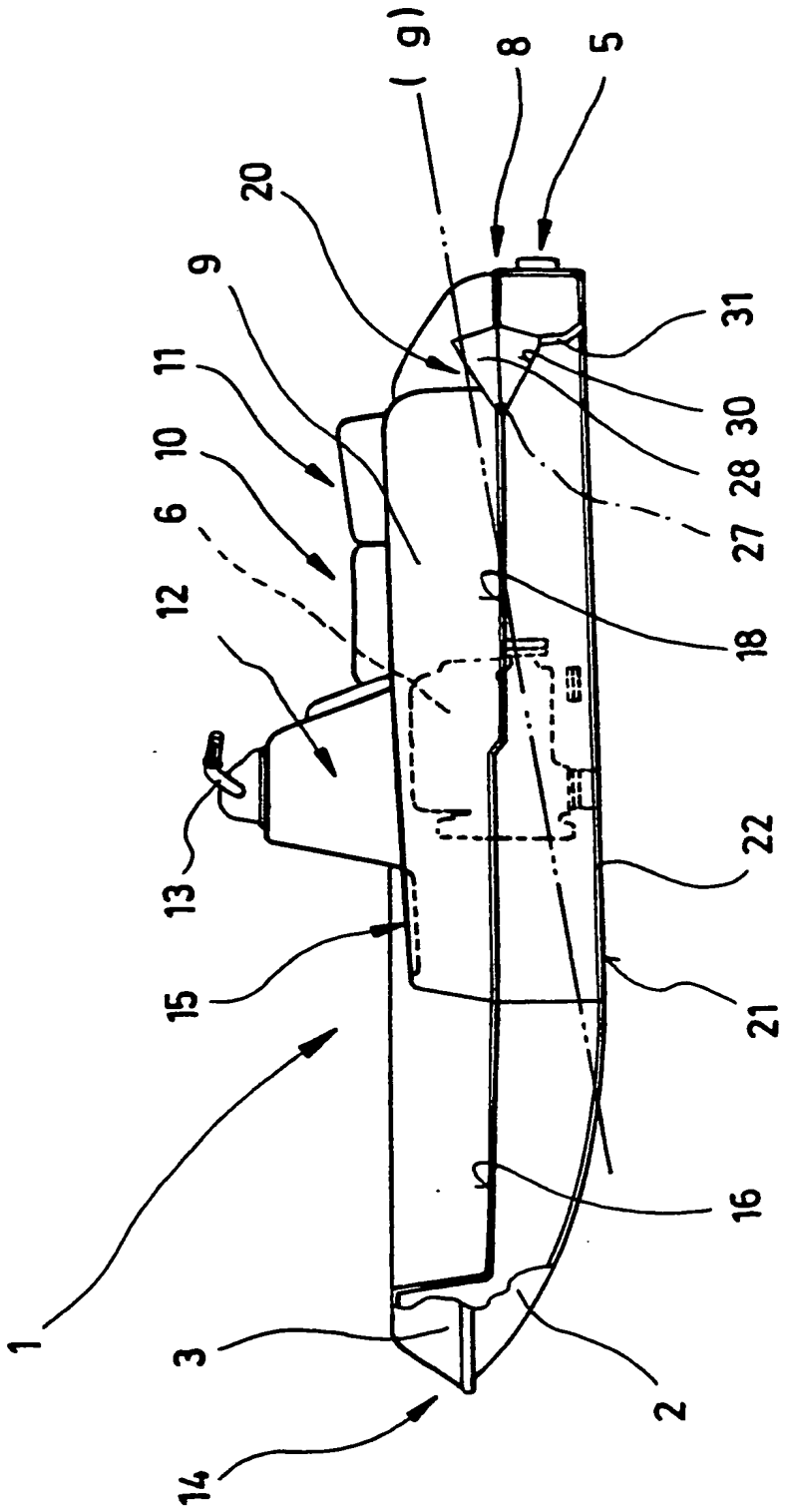

FIG.9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 11 3521

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X Y	US-A-3 790 977 (BOMBARDIER et al.) * Column 4, lines 8-15; figures 1,2,5 *	1,2 6	B 63 B 13/00 B 63 B 35/86
X	US-A-3 397 670 (BEDFORD) * Column 1, line 62 - column 2, line 3; figures 1,2 *	1,3	
Y A	FR-A-2 183 685 (BIER) * Page 1, lines 9-29; page 2, line 30 - page 3, line 13; figures 1-3 *	6 7	
A	GB-A- 325 852 (SCOTT-PAINE) * Page 1, lines 71-75; page 2, lines 64-74; figures 1-3 *	7,8	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 63 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16-11-1988	DE SENA Y HERNANDORENA A

CATEGORY OF CITED DOCUMENTS

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